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09/856,431	07/12/2001	Shigeru Fujita	9799107-0006	8311

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EXAMINER	
CREPEAU, JONATHAN	
ART UNIT	**PAPER NUMBER**
1746	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/856,431	Applicant(s) FUJITA ET AL.	
	Examiner Jonathan S. Crepeau	Art Unit 1746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 July 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *5* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Claim Objections

1. Claim 25 is objected to because of the following informalities: there is no period at the end of the claim. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-6, 8-12, 15, and 24-28 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 11-31534. Regarding claims 1 and 24, the reference is directed to a secondary battery comprising a negative electrode, a positive electrode, and an electrolyte. Regarding claim 11, the negative electrode contains a carbonaceous material (i.e., graphite) (see abstract). Regarding claim 8, the charging capacity of the graphite would inherently be at least 150 mAh/g. Regarding claim 9, the thickness of the negative electrode mixture layer is 0.19 mm (190 microns) (see paragraph 19 of the machine translation). Regarding claim 12, the positive electrode comprises a lithium transition metal oxide (see abstract). Regarding claim 15, the electrolyte comprises ethylene carbonate and propylene carbonate (see paragraph 15). Regarding claim 10, the porosity of the negative electrode material layer can be 50% (see battery "U" in

Table 2). Regarding claims 1, 2, 6, 24, 25, and 26, as disclosed in paragraph 9, when the porosity is higher than 45%, lithium precipitates on the negative active material as well as being intercalated therein. Thus, as recited in claim 24, the capacity of the negative electrode may be expressed as the sum of the intercalation capacity and the precipitation capacity. Regarding the recitation in claims 1 and 3 that the lithium precipitates in a state where an open circuit voltage (0-4.2V) is lower than an overcharge voltage, this limitation is inherent in the reference. Note the teaching in paragraph 9 that lithium precipitates during normal operation of the battery when the porosity of the negative electrode is higher than 45%. Hence, the lithium would inherently begin to precipitate when the open circuit voltage of the battery is lower than the overcharge voltage. Regarding claims 4, 5, 27, and 28, these limitations recited in these claims do not have to be accorded patentable weight because they do not further limit the structure of the claimed battery. The claims merely recite the various lithium metal and lithium ion peaks that are present when the negative electrode material is measured by a nuclear magnetic resonance spectroscopy method. As this method does not limit the structure of the battery, it does not have to be accorded patentable weight. However, such peaks would be inherent even if such a method were to be employed.

Thus, the instant claims are anticipated.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 7, 16, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 11-31534.

The reference is applied to claims 1-6, 8-12, 15, and 24-28 for the reasons stated above. However, the reference does not expressly teach that the maximum amount of lithium precipitating the negative electrode is from 0.05 to 3.0 times the ability of the charging capacity of the negative electrode, as recited in claim 7, or the weight/volume ratios of ethylene carbonate and propylene carbonate, as recited in claims 16 and 17.

However, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be sufficiently skilled to manipulate the porosity of the negative electrode of JP '534 so as to affect the amount of lithium that precipitates. The reference recognizes that a higher porosity allows more lithium to precipitate. It has been held that the discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. *In re Boesch*, 205 USPQ 215 (CCPA 1980). Thus, the range of precipitating lithium recited in claim 7 is not considered to distinguish over the reference.

Further, the artisan would be able to optimize the ratio of ethylene carbonate to propylene carbonate to affect electrolyte characteristics such as boiling point and decomposition potential. Accordingly, the relative ratios (amounts) of ethylene carbonate and propylene carbonate recited in claims 16 and 17 are not considered to distinguish over the reference.

6. Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 11-31534 in view of Visco et al (U.S. Patent 6,025,094).

JP '534 is applied to claims 1-6, 8-12, 15, and 24-28 for the reasons stated above. The reference further teaches that the liquid electrolyte comprises an $LiClO_4$ solute (see paragraph 15). However, the reference does not expressly teach that the electrolyte may be solid, as recited in claim 23, or that the solute may comprise $LiPF_6$, as recited in claim 22.

Visco et al. is directed to negative electrodes for lithium batteries (see col. 1, line 28). In column 16, line 21, Visco et al. teach that the electrolyte solute may comprise $LiClO_4$ and $LiPF_6$, among other materials. Further, in column 14, line 20, the reference teaches that the electrolyte may be "liquid, gel, or solid."

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the disclosure of Visco et al. indicates that $LiClO_4$ and $LiPF_6$ are equivalent as electrolyte solutes, and that a solid electrolyte is equivalent to a liquid electrolyte. Thus, the artisan would possess sufficient skill to substitute the $LiClO_4$ solute and liquid electrolyte of JP '534 with an $LiPF_6$ solute and a solid electrolyte, respectively. An express suggestion to substitute one equivalent component or process for another is not necessary to render such substitution obvious. *In re Fout*, 675 F.2d 297, 213 USPQ 532 (CCPA 1982); MPEP §2144.06.

7. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 11-31534 in view of JP 4-328278.

JP '534 is applied to claims 1-6, 8-12, 15, and 24-28 for the reasons stated above. However, the reference does not expressly teach that the positive electrode contains lithium carbonate, as recited in claims 13 and 14.

JP 4-328278 is directed to a nonaqueous electrolyte secondary battery. The positive electrode contains lithium carbonate (see abstract).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by JP '278 to include lithium carbonate in the positive electrode of JP '534. In the abstract, JP '278 teaches that the purpose of the lithium carbonate is "to operate a current cutting means securely when a nonaqueous electrolyte battery comprising a current cutting means is overcharged, and prevent heat generation with quick temperature rise and the relatively quick breakage." Accordingly, the artisan would be motivated to include lithium carbonate in the positive electrode of JP '534.

8. Claims 18, 19, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 11-31534 in view of Shimizu (U.S. Patent 5,709,968).

JP '534 is applied to claims 1-6, 8-12, 15, and 24-28 for the reasons stated above. However, the reference does not expressly teach that the electrolyte comprises a small amount of 2,4-difluoroanisole, as recited in claims 18 and 19, or that the electrolyte contains dimethyl carbonate (DMC) and ethyl methyl carbonate (EMC) in addition to ethylene carbonate (EC) and propylene carbonate (PC), as recited in claim 21.

Shimizu is directed to a nonaqueous electrolyte secondary battery. In the abstract, the reference teaches that a benzene compound is added to the electrolyte. In Table 1, 2,4-difluoroanisole is identified as being a suitable compound. Further, in column 12, line 40, the reference teaches that the electrolyte solvent contains EC, PC, DMC, MEC, g-butyrolactone, methyl propionate, ethyl propionate or a combination thereof.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by Shimizu to include 2,4-difluoroanisole in the electrolyte of JP '534. In the abstract, Shimizu teaches that the battery is "capable of quickly interrupting overcharge current and overcharge reactions even if overcharged during charge with a great electric current so that thermal runaway occurring due to overcharge current is prevented." Accordingly, the artisan would be motivated to include 2,4-difluoroanisole in the electrolyte of JP '534.

Further, the artisan would be motivated by the disclosure of Shimizu to add DMC and EMC to the EC/PC solvent of JP '534. As noted above, the reference teaches that these solvents are useful in the electrolyte either alone or in combination. The courts have held that it is *prima facie* obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition which is to be used for the very same purpose (*In re Kerkhoven*, 205 USPQ 1069 (CCPA 1980)). Accordingly, the EC/PC/DMC/EMC composition of claim 21 is not considered to distinguish over the references.

9. Claims 18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 11-31534 in view of Simon et al (U.S. Patent 5,626,981).

JP '534 is applied to claims 1-6, 8-12, 15, and 24-28 for the reasons stated above. However, the reference does not expressly teach that the electrolyte comprises a small amount of vinylene carbonate, as recited in claims 18 and 20.

Simon et al. is directed to a rechargeable lithium cell. In column 2, line 35, the reference teaches that vinylene carbonate is added to the electrolyte in an amount of 0.01 to 10 wt%.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by Simon et al. to include vinylene carbonate in the electrolyte of JP '534. In column 2, line 17, Simon et al. teach the following:

> During the first charge of the cell, the soluble compound added to the electrolyte reduces at a potential which is higher than the intercalation potential of the solvated lithium ions. On reducing, it forms a passivation layer on the carbon-containing material before any intercalation of the lithium. This then constitutes a physical barrier preventing intercalation of the solvent molecules surrounding the lithium ions. The lithium ion thus penetrates into the carbon by itself and exfoliation is prevented.

Accordingly, the artisan would be motivated to include vinylene carbonate (i.e., the above-identified soluble compound) in the electrolyte of JP '534.

Double Patenting

10. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or

improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

11. Claims 24-28 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-16 of copending Application No. 10/126,895 (U.S. Pre-Grant Publication No. 2003/0008212). Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of the '895 application anticipate the instant claims. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

12. Claims 24-28 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-7 of copending Application No. 09/954,806 (U.S. Pre-Grant Publication No. 2002/0076605). Although the conflicting claims are not identical, they are not patentably distinct from each other because the

claims of the '806 application anticipate the instant claims. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Conclusion

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (703) 305-0051. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski, can be reached at (703) 308-4333. The phone number for the organization where this application or proceeding is assigned is (703) 305-5900. Additionally, documents may be faxed to (703) 872-9310 (for non-final communications) or (703) 872-9311 (for after-final communications).

Any inquiry of general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

JSC

October 1, 2003

J. Crepeau
JONATHAN CREPEAU
PATENT EXAMINER
ART UNIT 1746